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노인요양시설 거주 노인의 구강건강상태와 건강 관련 삶의 질과의 관계

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Relationship between Oral Health Status and Health Related Quality of Life in Elderly People Living in Long-Term Care Facilities

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Objectives: The purpose of this study was to examine the association between oral health status and health related quality of life (HRQoL) in elderly people living in long-term care facilities.

Methods: The study was conducted on 81 elderly people who were capable of communicating and were residing in a long-term care facility in Cheonan City. Individual interviews were conducted using a structured questionnaire. The relationship between oral health and HRQoL was analyzed.

Results: The odds ratio (OR) of having a mobility problem was 4.19 for respondents with a chewing problem and 4.20 for respondents with a pronunciation problem. The OR of having a 'usual activity' problem was 5.93 for respondents with a chewing problem and 7.56 for respondents with a pronunciation problem. The OR of having pain/discomfort was 4.32 for respondents with toothache, 5.41 for respondents with a chewing problem, and 6.94 for respondents with a pronunciation problem. The OR of having anxiety/depression was 3.77 for respondents with poorly perceived oral health status, 3.61 for respondents with toothache, 9.20 for respondents with a chewing problem, 6.61 for respondents with a pronunciation problem.

Conclusions: Among the elderly living in long-term care facilities, the EQ-5D components representing HRQoL were associated with oral health status. Medical institutions should pay more attention to the oral health of elderly people living in elderly care facilities. A national system should also be developed to improve the oral health and quality of life of the elderly. Further longitudinal study is needed to determine the detailed causal relationships between oral health status and HRQoL.

Keywords Elderly, Long-term care facilities, Oral health, Quality of life, EQ-5D

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Ⅰ. Introduction

The development of modern medical technology and socio-economic development have extended the average life expectancy of humans. As a result, the aging of the population is increasing worldwide. In addition, the proportion of the elderly among the total population is gradually increasing due to an increase in life expectancy and a rapid decrease in the birth rate[1]. However, one of the biggest unexpected problems of this life extension is the increase in the non-health life span that cannot lead to a healthy life[2]. According to the data released by the National Statistical Office in 2010, Korea has entered an aging society in 2000, when the ratio of those aged 65 or over was 7.2%. In 2018, this ratio will reach 14.3%, and it will reach 'aged society'. In 2026, it will reach 20.8% and reach 'super aged society'[3]. Therefore, the change in medical demand, the increase of the national burden of medical expenses, and the burden of social support are expected to increase due to the aging of the population[4].

75,081 nursing homes in 2006 increased to 89,919 in 2016, and the long-term care facility (LTC facilities) have recently been established at a very rapid pace nationwide due to the implementation of the Long - Term Care Act of the Elderly in 2008[5,6]. However, the numerical increase of these hospitals cannot be interpreted as the improvement of the elderly's general health and quality of life. Most elderly people who use LTC facilities have limitations in performing oral care on their own because they are elderly people with limited mobility[7,8]. Moreover, LTC facilities do not provide systematic dental health services, and the placement of dental health workers for them is not well done[9]. In Park's research, the survey was conducted to investigate the oral care, oral care awareness and educational needs provided by the nursing staff for the elderly. Both nurses and nursing caregivers perceived oral care as important. But they felt the task was very difficult and responded that proper oral care guidelines were needed[10].

Oral health plays an important role in maintaining overall body health. Poor oral health can reduce the efficiency of mastication, leading to unbalanced nutrition and digestive problems. This affects the quality of life of the elderly by causing problems with general health[11]. In addition, the loss of teeth not only brings about aesthetically detrimental changes, but also causes deterioration in chewing function and abnormal pronunciation, limiting interpersonal relationships and smooth social life. As a result, social alienation and isolation can be promoted for the elderly[12].

There are very few studies comparing the oral health and quality of life among the institutionalized elders. Therefore, the purpose of this study is to assess the relationship between oral health status and health related quality of life in elderly people living in LTC facilities and to provide useful evidences in improving the oral health and quality of life.

Ⅱ. Methods

1. Study subjects

This study was conducted on 81 elderly people who were resigned from the LTC facilities in Cheonan-city from March 19 to March 30, 2018. The data collection was summarized as follows: the interviewer interviewed directly the institution, explained the purpose, contents and purpose of the study and then interviewed only those who were able to communicate verbally who agreed to participate voluntarily.

Data collection was conducted as an ethical procedure to protect research participants after approval from the Institute's Review Board (IRB) (IRB No.: SM-201803-012-1). In order to reduce the error between the researchers, the researchers conducted preliminary training on the survey method. Six trained interviewer administered a face-to-face questionnaire that measured on oral health and quality of life.

2. Research methods

The questionnaire consisted of 12 items(3 basic items, 4 oral health items, 5 quality of life items). Age, gender, and education level was examined as basic characteristics. The oral health-related questions derived from the Korea National Health and Nutrition Examination Survey, using rolling survey sampling to ensure that the sampled data for each year were highly representative. In oral health, we surveyed perceived oral health status, toothache, chewing and pronunciation problem. To assess health-related quality of life, EQ-5D, a common HRQOL measurement tool developed by the EuroQol group, was used. The quality of life was examined for mobility, self-care, usual activities, pain/discomfort, anxiety/depression. In this study, the officially verified Korean version of EQ-5D-5L was used, and the quality of life score was calculated according to the Korean version of the valuation protocol[13].

3. Statistical analysis

Three research assistants recorded data from interviews on paper and entered the data into the database. We ensured data quality with periodic quality control checks and interventions. For the interview data, each research assistant checked the other’s data entry against the original hard copy and corrected any errors. Frequency analysis test and Chi-square test were performed on basic characteristic, bivariate association between

oral health status and HRQOL. Dependent variable was HRQoL, which was assessed with each component of EuroQol-5 dimension (EQ-5D). Independent variable was oral health status (perceived oral health, toothache, chewing problem, speaking problem and pronunciation problem). After adjustment for confounders (age, gender, education level, frequency of tooth brushing, dental checkup and unmet needs for dental checkup), logistic regression analysis was performed on the SES and health behavior on oral health. Statistical analysis on the collected data was performed using PASW Statistics 22.0 version (IBM Co., Armonk, NY, USA). Statistical significance level was set to 0.05.

Ⅲ. Results

The basic characteristics of the study were as follows. The average age of the study participants was 76.38 years. The distribution was 38.3% for male and 61.7% for female. Most of the subjects (73.8%) had a primary or lower education level. In oral health, poor perceived oral health status (44.4%), toothache (53.1%), chewing problem (40.7%) and pronunciation problem (33.3%) were reported. For EQ-5D components, Mobility (71.6%), self-care (67.9%), usual activities (66.7%), pain and discomfort (66.7%), anxiety and depression problems (45.7%) were reported. The closer the EQ-5D dimension is to 1, the higher the quality of health-related quality of life. The average EQ-5D level of the subjects was 0.37(Table 1).

<Table 1> Basic characteristics of subjects according to oral health

Characteristic			N (%)
Demographic factor	Age (y)		76.38±12.09
	Gender	Male	31(38.3)
		Female	50(61.7)
Socioeconomic factor	Education Level	≤Primary school	59(72.8)
		Secondary school	13(16.0)
		High school	6(7.4)
		≥College	3(3.7)
Oral health status	Perceived oral health status	Poor	36(44.4)
		Good	45(55.6)
	Experience toothache	Yes	43(53.1)
		No	38(46.9)
	Chewing problem	Yes	33(40.7)
		No	48(59.3)
	Pronunciation problem	Yes	27(33.3)
		No	54(66.7)
Health related quality of life (EuroQol-5 dimension)	Mobility	No problem	23(28.4)
		Any problem	58(71.6)
	Self-care	No problem	26(32.1)
		Any problem	55(67.9)
	Usual activities	No problem	27(33.3)
		Any problem	54(66.7)
	Pain/discomfort	No problem	27(33.3)
		Any problem	54(66.7)
	Anxiety/depression	No problem	44(54.3)
		Any problem	37(45.7)
EuroQol-5 dimension*			0.37±0.41

Values are presented as n (%) or mean±standard deviation.
*EuroQol-5 dimension was calculated by the Korean time trade-off values.

The oral health status and HRQoL associations identified through the EQ-5D component were as follows. Mobility and self-care items did not show significant differences according to oral health. Significant association was found between the Usual Activities and Pronunciation problems. Pain/Discomfort and Anxiety/depression items showed significant differences according to oral health status(Table 2).

Findings on multivariate association between oral health status and health related quality of life under adjustment for other related factors are shown in Table 3. The odds ratio (OR) of having anxiety and depression was 3.77 with poor oral health (OR = 3.77, 95% CI = 1.25 - 11.397). Pain and discomfort in who with toothache were 4.32 times higher than who without toothache (OR = 4.32, 95% CI = 1.30 - 14.29), and the OR of having anxiety or depression was 3.61 (OR = 3.61, 95% CI = 1.26 - 10.32). When there was a chewing problem, the OR of having mobility problems was 4.19 (OR = 4.19, 95% CI = 1.07 - 16.45), the OR of having usual activity problems

<Table 2> Bivariate Association between Oral Health Status and Health Related Quality of Life

Variable	Mobility		Self-care		Usual activities		Pain/Discomfort		Anxiety/depression	
	No problem	Any problem	No problem	Any problem	No problem	Any problem	No problem	Any problem	No problem	Any problem
Perceived oral health status										
Poor	9(25.0)	27(75.0)	9(25.0)	27(75.0)	10(27.8)	26(72.2)	7(194.)	29(80.6)	14(38.9)	22(61.1)
Good	14(31.1)	31(68.9)	17(37.8)	28(62.2)	17(37.8)	28(62.2)	20(44.4)	25(55.6)	30(66.7)	15(33.3)
p-value	0.544		0.221		0.343		**0.018**		**0.013**	
Experience toothache										
Yes	9(20.9)	34(79.1)	11(25.6)	32(74.4)	13(30.2)	30(69.8)	9(20.9)	34(79.1)	18(41.9)	25(58.1)
No	14(36.8)	24(63.2)	15(39.5)	23(60.5)	14(36.8)	24(63.2)	18(47.4)	20(52.6)	26(68.4)	12(31.6)
p-value	0.113		0.181		0.529		**0.012**		**0.017**	
Chewing problem										
Yes	6(18.2)	27(81.8)	8(24.2)	25(75.8)	8(24.2)	25(75.8)	5(15.2)	28(84.8)	11(33.3)	22(66.7)
No	17(35.4)	31(64.6)	18(37.5)	30(62.5)	19(39.6)	29(60.4)	22(45.8)	26(54.2)	33(68.8)	15(31.2)
p-value	0.091		0.209		0.150		**0.004**		**0.002**	
Pronunciation problem										
Yes	4(14.8)	23(85.2)	5(18.5)	22(81.5)	5(18.5)	22(81.5)	3(11.1)	24(88.9)	7(25.9)	20(74.1)
No	19(35.2)	35(64.8)	21(38.9)	33(61.1)	22(40.7)	32(59.3)	24(44.4)	30(55.6)	37(68.5)	17(31.5)
p-value	0.055		0.064		**0.046**		**0.003**		**< 0.001**	

Values are presented as N(%).
*p<0.05 by chi-square test

<Table 3> Multivariate Association between Oral Health Statue and Health Related Quality of Life under Adjustment for Other Related Factors

Variable	Mobility Adjusted OR[a] (95% CI)	Self-care Adjusted OR[a] (95% CI)	Usual activities Adjusted OR[a] (95% CI)	Pain/Discomfort Adjusted OR[a] (95% CI)	Anxiety/depression Adjusted OR[a] (95% CI)
Poor perceived oral health status(ref. no)	1.17(0.36-3.81)	1.67(0.51-5.51)	2.07(0.59-7.27)	2.43(0.78-7.62)	3.77(1.25-11.40)*
Experience toothache(ref. no)	3.35(0.99-11.26)	3.38(0.99-11.55)	2.22(0.67-7.35)	4.32(1.30-14.29)*	3.61(1.26-10.32)*
Chewing problem(ref. no)	4.19(1.08-16.45)*	2.88(0.78-10.69)	5.93(1.33-26.55)*	5.41(1.39-21.05)*	9.20(2.22-38.11)*
Pronunciation problem(ref. no)	4.20(1.01-17.57)*	3.54(0.93-13.50)	7.56(1.62-35.19)*	6.94(1.60-30.13)*	6.61(2.02-21.60)*

Dependent variable: EuroQoL-5 Dimension components (ref. no problem).
OR: odds ratio, 95% CI: 95% confidence interval, ref: reference.
[a]Adjusted odds ratio taking account for age, gender, education level, frequency of tooth brushing, Dental checkup, Unmet needs for dental checkup.
*p<0.05 by logistic regression

was 5.93 (OR = 5.93, 95% CI = 1.33 - 26.55), the OR of pain and discomfort was 5.41 (OR = 5.41, 95% CI = 1.39 - 21.05), and the risk of having anxiety and depression was 9.20 times higher(OR = 9.20, 95% CI = 2.22 - 38.11). The OR of having mobility problems was 4.20 times higher when having a pronunciation problem, 7.56 when having an usual activity problems, 6.94 when having a pain and discomfort problem, and 6.61 when having an anxiety and depression problem.

Ⅳ. Discussion

According to the results of this study, oral health of the elderly living in LTC was found to be significantly related to quality of life. These results were also found in previous studies. In a study by Cornejo M et al[14], a high percentage has poor oral health related to poor OHRQoL. Quality of life is also highly related to social interaction. Social isolation is a growing concern in long-term care (LTC) facilities, and weak social contact appears to actually contribute to the risk of oral and systemic health[15-18]. In the same vein, dental problems, such as bad breath and tooth loss, interfere with people's interactions, and solving these problems can improve not only social confidence but also quality of life[19,20]. Therefore, since oral health of elderly people living in LTC facilities has a wider range of values beyond just dental concepts, their oral health must also be improved in order to pursue socially healthy aging. Also, oral health promotion will be possible through institutional support such as the introduction of policies.

As a result of this study, the deterioration of oral health status was significantly associated with OHRQoL. These results have been reported in previous studies. Promoting oral health improves self-esteem, which can contribute to psychological well-being[21]. In a study on self-reported periodontal health status, it was reported that the elderly who answered that they were healthy had significantly higher quality of life than those who did not[22]. Previous studies also reported that toothache is a major determinant of OHRQoL in elderly patients and suggested that more attention should be paid to oral disease management to improve their quality of life[23,24]. In a previous study of elderly people not living in LTC facilities in Korea, the AOR of toothache for ORHQoL (EQ-5D) was 1.73 for pain/discomfort and 1.50 for anxiety/depression[25]. These OR scores were lower than in our study on elderly living in LTC facilities. More studies are needed to analyze the effects of LTC facilities residency on oral health and quality of life in the elderly.

The results of this study confirmed the relationship between functional oral problems(chewing, pronunciation) in oral and OHRQoL. In the Korean study using national data, the elderly with reduced chewing ability had 2.36 times lower OHRQoL analyzed by EQ-5D than the healthy elderly[26]. According to the InCHIANTI study, older adults with chewing problems are 1.81 times more depressed, and this association has not been found in older adults with full denture[27]. Previous studies have also reported that pronunciation problems due to tooth loss affect the quality of life of the elderly[28]. Problem with partial denture may cause orofacial symptoms in such participants, which may cause difficulties in mastication, eating, and pronunciation, thus reducing well-being. Oral rehabilitation with new removable dental prostheses improved oral health related QoL in elders with and without partial denture[29].

As the results of this study, it is not surprising that elderly LTC facilities residents often face oral health problems. Self-care problem is general in the LTC facilities population because of impaired visual acuity and decreased manual dexterity. LTC facilities residents often rely on personal caregivers, who may be overloaded with other task and may have little training in oral management for daily oral care[30,31]. Korea does not have a dental clinic staff in LTC facilities, and there is no legal basis for it. This study suggests institutional support for improving access to medical care is needed to promote oral health for the elderly in LTC facilities. To improve the oral health and quality of life of older people in LTC facilities, we suggest three things: First, there is a need for a dental hygienist who can provide professional oral care services to the elders and provide systematic oral care education to caregivers. Second, it is necessary to calculate the dental insurance fee in the long-term care insurance system. Third, there is a need for a management area where dental hygienists

can provide professional care. In summary, it is necessary to establish an institutional framework for promoting oral health of elderly people living in elderly care facilities.

Our study had the following limitations. First, since it is limited to the elderly in the LTC facilities established in a specific area, we did not expect the sample from this survey to be representative of all LTC facilities residents in Korea. Second, because the opinions of serious patients with loss of cognitive and functional capacity were excluded, the oral health and quality of life conditions investigated in this study may be better than actual averages. This bias would overestimate the true status of LTC facilities residents. Third, in the case of the elderly who have limited mental function, there may be a part of the questionnaire responded to by the help of a pre-trained investigator. Despite these limitations, this study is meaningful in confirming that it affects oral health, mental health and quality of life. Therefore, it is meaningful to analyze the relationship between oral health and mental health more systematically and to use the basic data to lead a better life by establishing a system to improve the quality of life of the elderly in an aging society.

V. Conclusions

Associations between oral health and health related quality of life support the view that support of oral health care influence quality of life outcomes of the elderly living in LTC facilities. The medical institution should pay more attention to the oral health of elderly people living in elderly care facilities. Also, national system should be developed to improve their oral health and quality of life. A cooperative effort from many disciplines will be needed to provide these missing links in Korea oral health services and to realize the principle of providing maximum benefit to the least advantaged in society.

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